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SULFIDES IN VIRGINIA

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Introduction

World-wide economic conditions have recently focused the attentions of mining and exploration organizations on deposits of basemetal sulfides, primarily those bearing copper, lead, and zinc. As a former mining province the southeastern Piedmont states, including Virginia, are being re-examined for possible mineable deposits.

The basemetals--copper, lead, zinc, cobalt, and nickel--occupy places in American economy comparable to those of iron and manganese. In the southeastern United States, basemetals occur most commonly in the form of sulfides, that is, in chemical combination with sulfur. Other occurrences, such as oxides, sulfates, carbonates, silicates, and sulfosalts, have locally proved important, and in many cases bear specific relationships to sulfide accumulations.

Sulfide deposits in Virginia may be classified geologically as (1) those occurring in metamorphosed crystalline rocks, and (2) those in relatively undeformed carbonate rocks. The first type, deposits in metamorphic rocks, are restricted to the Piedmont-Blue Ridge region, bounded by the Coastal Plain on the east and the Great Valley on the west. Deposits in the younger carbonate rocks are found only in the Great Valley. Further, within each of the general areas, mineralized centers or belts exist, which may be termed districts. These districts are outlined in Figure 1, and, with component mines and prospects, are more fully discussed later in this article.

History

Historical data reveal that sulfides were mined in Virginia as early as 1750, when Colonel Chiswell commenced operations in Wythe County. At this time, only lead was recovered although the primary ore consisted of sulfides of lead, zinc, and iron. It is probable that this mine provided lead for Washington's forces during the Revolutionary War. Shipments of zinc ore from Austinville for trial smelting were made as early as 1864; however, significant zinc production did not occur until 1878-79. The Austinville area is today an important zinc-lead producer in the East.

Zinc and lead were produced from the Albemarle Lead and Zinc Company mine, Albemarle County, the Allah Cooper mine, Louisa County, and the Valzinco mine, Spotsylvania County. Only the mines in Wythe County are currently operating.

The early history of copper mining in Virginia is poorly documented, but mining prior to the Revolutionary War is cited for two localities--Appomattox and Charlotte counties. Later mining was concentrated in three areas--the Virgilina, the "Great Gossan Lead," and the northern Blue Ridge districts. The latter did not attain significant production, and none are producing today.

Iron sulfides, the most common of the basemetal sulfides, have played an important role in the mining history of Virginia. Former pyrite mines, such as Cabin Branch, Austin Run, Sulfur, Boyd Smith, and Arminius, are well known to residents of the northern Virginia Piedmont. Iron and pyrite mining began in the Mineral district (Louisa County) as early as 1834, and at about the turn of the 20th Century, Louisa and Prince William counties provided nearly 50 percent of the total pyrite production of the United States. The discovery of sulfur in Sicily, and later in the southern United States, forced cessation of pyrite mining in the East.

At present, only two sulfide districts are being exploited in Virginia--the "Great Gossan Lead" and Austinville (Wythe County). Lead-zinc-copper production figures for the fifteen year period 1940-54 are cited in Table I.

Ores and Types of Occurrence

Basemetal sulfide ore minerals are numerous; however, relatively few are of economic importance in Virginia. The more common of these, with chemical composition, are listed in Table II. The principal sulfide ore minerals are sphalerite (zinc), galena (lead), pyrite (iron and sulfur), chalcopyrite (copper), bornite (copper), and chalcocite (copper). At most localities, secondary products (silicates, carbonates, and sulfides) derived from the primary sulfides were important in the early stages of mining.

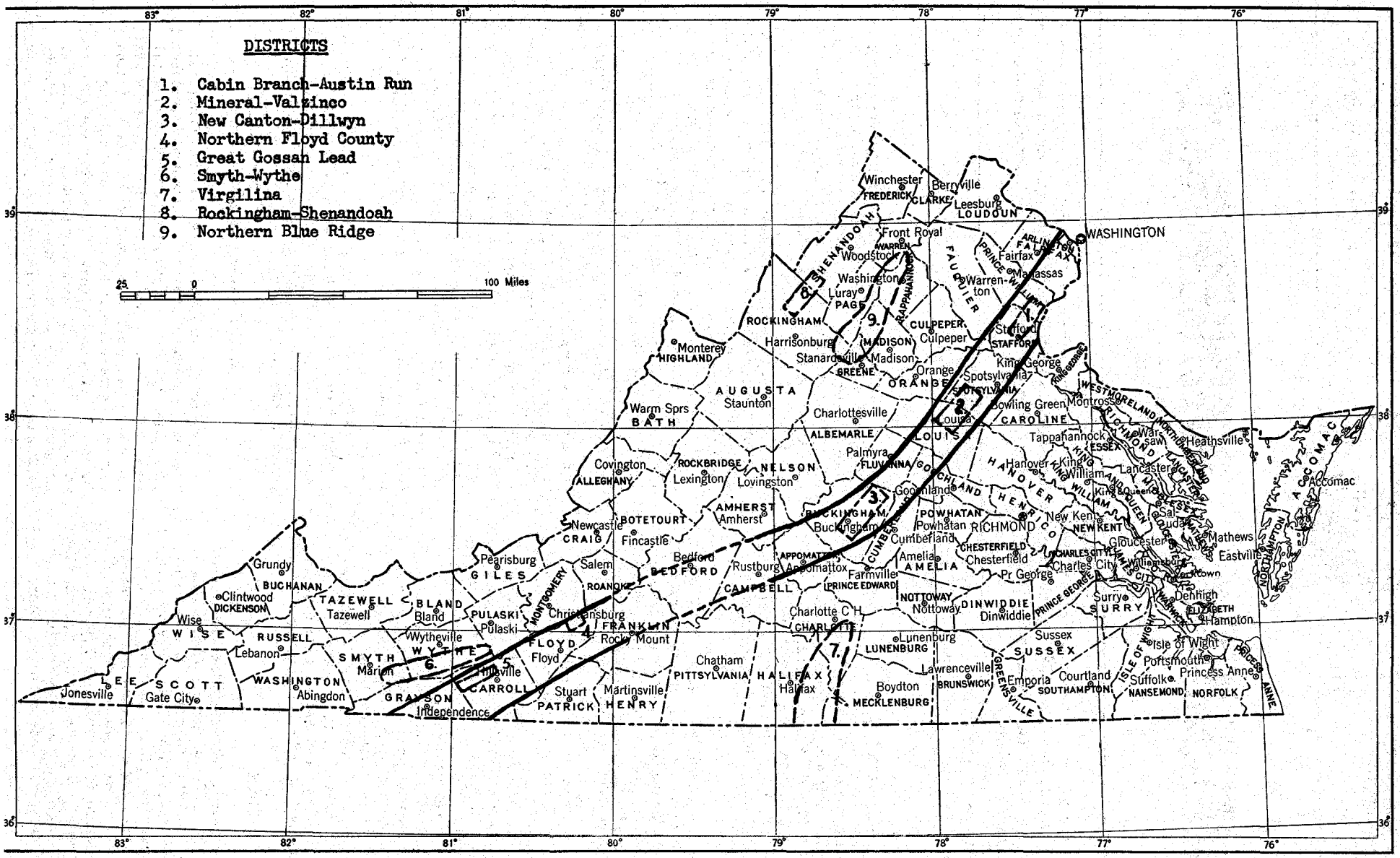

Figure 1. Distribution of Sulfide Districts in Virginia

Rarely does a deposit of one basemetal sulfide alone prove commercial. Commonly, the sulfides occur as complex intergrowths, such as mechanical combinations of sphalerite, galena, chalcopyrite, and pyrite. Occasionally, one or two minerals will predominate greatly within a district, as sphalerite in the Timberville district and bornite-chalcocite in the Virgilina district.

The concept that all commercial metallic minerals are found only in "veins" is a popular fallacy. It is true that, at certain places, nearly all of the sulfides occur as fracture fillings (veins) or associated with vein quartz. However, the larger orebodies are generally in the form of pod-like lenses (Piedmont) or irregular pipes in highly shattered rock (Great Valley). The Piedmont orebodies are considered to have been formed through localized replacement of the country rock, whereas in the Valley deposits, sulfides occupy open spaces formed along zones of weakness in the earth's crust.

The deep weathering of bedrock in the Piedmont and Blue Ridge Plateau regions has proved a decided deterrent to sulfide exploration. Soil cover in many places extends to depths of 60 to 100 feet. The same processes responsible for transforming bedrock into soil also brought about changes in shallow sulfide concentrations. The most familiar and most spectacular of these changes is the formation of an iron oxide (limonite-hematite) cap or "gossan" over the sulfide body (Fig. 2). Gossan zones serve as a guide to ore, and many of the known sulfide orebodies were discovered through exploration of such zones. However, gossans afford little in the way of information on the composition, character, or extent of the primary ore. A "leached" or barren zone of variable thickness is usually present below the gossan cap. The primary sulfides formerly present in this area were dissolved by acid ground water and transported downward to the water table (oxidized zone). Oxidized ores occur in the form of sulfides, sulfates, carbonates, silicates, or native metals. Most of the rich copper deposits of the southeastern states have been due to heavy accumulations of secondary ore.

Distribution of Mineralization

Figure 1 shows, in generalized form, the distribution of sulfide mineralization in Virginia. The most striking feature, brought out by plotting individual centers, is the so-called "Sulfide Belt" of the Piedmont-Blue Ridge area. The limits of this belt, as shown in Figure 1, are not definitive, but are intended only to outline the apparent trend. The Sulfide Belt contains five known centers of mineralization, all of which are currently being explored.

Outside of the Sulfide Belt, several isolated, though nonetheless potentially important, districts exist. Foremost among these are the Smyth-Wythe zinc-lead district, the Rockingham-Shenandoah zinc district, and the Virgilina copper district. The northern Blue Ridge copper district does not now appear to offer commercial possibilities.

District 1.-- Cabin Branch-Austin Run. This district, the northeasternmost in Virginia, comprises parts of Stafford and Prince William counties and contains two abandoned sulfide mines. The larger of these mines, the Cabin Branch mine near Dumfries, was opened in 1889, and steady production was maintained from 1908 to 1919. The mine was operated primarily for pyrite, although sufficient copper (chalcopyrite) was present in the ore to justify maintenance of a small copper smelter. Available statistics indicate that 207,262 long tons of pyrite ore were produced in the period 1908-20, with a total value of $1,168,513. This mine now lies within the limits of the Prince William Forest Park.

The history of the Austin Run mine, located near Garrisonville, Stafford County, is similar to that of the Cabin Branch mine. The Austin Run mine produced only pyrite ore, and this in limited quantities. Total reported production for the years 1908-20 amounted to 3,876 long tons, with a declared value of $26,136. The immediate vicinity of this property has been recently investigated by several exploration groups.

District 2.-- Mineral-Valzinco. This district lies in adjoining parts of Louisa and Spotsylvania counties and contains five former producing mines: Boyd-Smith, Arminius, Sulfur, Allah Cooper (Valcooper), and Valzinco.

The Smith, Arminius, and Sulfur mines, located along a narrow ridge immediately northeast of Mineral, are perhaps the most famous mines in the State. Beginning in 1834, these mines were successively and intermittently worked for iron, copper, and sulfur. During the period of most intensive development, 1882-1905, the mines were operated for pyrite, although some lead and zinc were recovered. Production data for these mines are not available. The mineralized zone containing these three former mines is being actively explored by a major mining company.

The Valzinco (Holladay) mine, near Bells Cross Road, has been operated several times, principally 1914-18 and 1942-45. The mine is in a lead-zinc deposit which carries minor copper values. Early production apparently consisted of about 5,000 tons of ore. Production data are not available for the latter period. This mine, as all others in District 2, is inoperative.

The Allah Cooper (Valcooper) mine lies about 5 miles northeast of Mineral, near Wares Cross Roads. This mine was initially opened as a gold and silver mine, but operations after early 1915 were for lead and zinc. Latest reported operations were between 1915 and 1918, during which time the apparently small orebody was exhausted. Production data are not known.

District 3.-- New Canton-Dillwyn. District 3, lying entirely within Buckingham County, exhibits many evidences of sulfide mineralization. Numerous small mines and prospects were opened in this area prior to 1900, although none attained significant production. Nearly all of these workings revealed complex sulfide mineralization, consisting of lead, zinc, and copper minerals.

Attention has recently been focused on this district by the exploration program of the Virginia Mining Corporation. This organization, after three years of active exploration and diamond core drilling, has blocked out approximately one-half million tons of zinc-lead-copper ore (Richmond Times Dispatch, July 10 and 31, 1955). The success of this project has given new impetus to sulfide exploration in this part of Virginia.

Year	Lead	Zinc	Copper
1940	2285	16927	----
1941	3390	22913	----
1942	1803	15991	28
1943	2288	18603	100
1944	4622	19667	291
1945	4243	16075	70
1946	4381	16905	----
1947	3803	16788	5
1948	4703	15882	----
1949	3313	13166	----
1950	3254	12396	----
1951	1508	7332	----
1952	3792	13409	----
1953	2016	16676	----
1954	3495*	16340*	----

*Preliminary estimates.

Table I. Reported Production of Lead, Zinc and Copper in Virginia, 1940-1954. (In short tons of recovered metal)

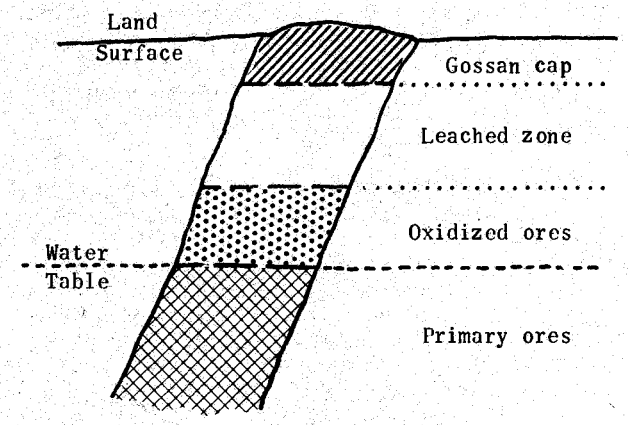

Figure 2. Generalized Cross-section of a Tabular Sulfide Body in the Piedmont Region.

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Ore	Minerals	Composition	Associated Products
Lead	Galena	PbS	Cerussite - $PbCO_3$
Zinc	Sphalerite	(Zn,Fe)S	Calamine - $Zn_4(OH)_2Si_2O_7 \cdot H_2O$ Smithsonite - $ZnCO_3$
Iron & Sulfur	Pyrite Pyrrhotite	FeS_2 FeS	Melanterite - $(Fe,Cu,Zn)SO_4 \cdot 7H_2O$
Copper	Chalcopyrite Bornite Chalcocite	$CuFeS_2$ Cu_5FeS_4 Cu_2S	Malachite - $Cu_2(OH)_2CO_3$ Azurite - $Cu_3(OH)_2(CO_3)_2$ Chalcocite - Cu_2S
Arsenic	Arsenopyrite	FeAsS	
Nickel	Nickel-bearing pyrrhotite Pentlandite	(Fe,Ni)S (Fe,Ni)S	
Cobalt	Cobaltite	CoAsS	

Table II. The More Common Sulfides, with Composition and Associated Secondary Products.

District 4.-- Northern Floyd County. This small district is discussed as an entity because of the rather unusual mineralization present. The area includes one former mine and one major prospect.

In 1903 a sulfide orebody composed largely of arsenopyrite was developed by the United States Arsenic Mines. Little is known of the total production from this mine, but during 1905 the maximum monthly capacity was 90 tons of pure arsenic. Operations were suspended by late 1906. The mine was located just north of Terrys Fork, in northern Floyd County.

A small exploratory prospect is located on Lick Fork, about 4 miles northeast of the arsenic mine. This prospect, known since before the Civil War, has been of continued interest to mining companies because of the moderate amounts of nickel and traces of cobalt present. The primary ore consists of pyrrhotite with some chalcopyrite and pentlandite. This property and its extensions are being investigated.

District 5.-- Great Gossan Lead. The Great Gossan Lead district comprises the largest single zone of sulfide mineralization in Virginia. This zone extends for about 16 miles, in nearly unbroken fashion, from Monarat to a point midway between Hillsville and Sylvatus in Carroll County. Ross has termed the Gossan Lead "one of the largest sulphide bodies known." Mining operations on the "Lead" have been in nearly continuous operation for more than a century. In the mid-1800's the mines were remarkable producers of secondary copper ores; later, the gossan zone was mined for iron ore. At present, the primary pyrrhotite ore is being utilized in the production of sulfuric acid, and, for this purpose, the large tonnages remaining constitute a major sulfur reserve.

The Gossan Lead first became famous because of heavy concentrations of "black" copper ore (chalcocite). In 1854 there were eight producing copper mines, and a six-month production record for 1855 reported shipments of 1,545,363 pounds of ore averaging 25% copper. This rich copper ore was easily accessible and rather rapidly mined out. By 1890, mining interests had shifted to gossan iron ore.

The only current operation in this district is the Gossan Mine, under control of the General Chemical Division. This mine is located just north of Galax, on the southwestern terminus of the "Lead."

District 6.-- Smyth-Wythe counties. This district, as defined by Currier, covers approximately 200 square miles. Mines and prospects included within this area are too numerous to cite here; Austinville, Ivanhoe, and Rye Valley are the better known.

As previously noted, this district is the scene of some of the earliest mining activity in the State, and these operations have been nearly continuous from the mid-18th Century to the present. This southwesternmost district is the second currently producing district within the State, and is responsible for nearly all of the zinc-lead output cited in Table I.

The district, as a whole, is classified as a zinc-lead district with zinc minerals greatly predominating. The Rye Valley mine, at Sugar Grove, was an exception; its production was primarily from a vein of galena. Copper minerals, at all localities, are conspicuous by their rarity.

Nearly all of present operations are underground, and sphalerite-galena-pyrite constitute the primary ore. Insofar as is known, ore occurs in pipe-like or sheet-like masses of broken rock (breccia), the locations of which are apparently controlled by one or more zones of fracturing in the carbonate rocks (limestone and dolomite).

In the early decades of the industry at Austinville, however, the operations were open-pit and stripping, utilizing the exceptionally pure secondary zinc minerals, calamine and smithsonite. These minerals were formed through the oxidation of sphalerite at and above the ground-water table, and occurred as "soft ore" sheets and masses in residual clays. Apparently, little production is obtained from these ores today.

District 7.-- Virgilina. Nearly equal parts of this district lie in North Carolina and Virginia. The Virginia portion covers parts of Charlotte, Halifax, and Mecklenburg counties, and comprises some 750 square miles. During the period 1890-1910 many tons of high-grade copper ore were extracted from more than a score of mines. Of these, the High Hill, Blue Wing, Durgy, and Holloway mines are still familiar to mining and exploration geologists.

In the Virgilina district, the copper minerals, primarily bornite and chalcocite, are associated with quartz in true fissure veins. The veins pinch and swell and are normally of limited lateral extent. The so-called Mother Lode vein is an exception, being traceable for nearly three and one-half miles. Zones of country rock bearing native copper are known, but were of little commercial significance in the past.

According to recent newspaper reports, the Virgilina district is being explored by a major mining company, Ventures, Ltd., of Canada. This organization has reportedly leased large acreages and plans an extensive drilling program in both Virginia and North Carolina (Durham Morning Herald, March 13, 1955).

District 8.-- Rockingham-Shenandoah. A northeast-southwest trending belt, of some 50 square miles, has been recently delimited as a probable mining district. The district lies in adjoining parts of Rockingham and Shenandoah counties, and contains two abandoned mines and numerous prospects. In recent years, this general area has been intensively prospected by three of the major zinc-producing companies.

Mineralization is in carbonate rocks and is of the zinc-lead type, with zinc minerals predominating. Evidences of sulfide mineralization are widespread, but economic concentrations are few. Mining dates at least to Civil War days, when galena was extracted from the Wine property, near Moores Store. The latest activity at this mine was in 1929 and 1930. A zinc-bearing property, north of Timberville, was operated during 1948-50 by the Timberville Mining Co. About 150 tons of zinc ore were shipped to Mascot, Tenn., for processing during 1949 and 1950.

The exploration program maintained in this district within the past few years served to outline at least one potentially economic orebody and several mineralized zones.

District 9.-- Northern Blue Ridge. The northern Blue Ridge copper district, embracing parts of six counties, extends southward from Front Royal to the latitude of Stanardsville. Although extensively prospected and many small mines developed, this district never attained significant production.

The mineralization is rather spectacular, consisting of metallic (native) copper and the copper oxide, cuprite (Cu_2O), with minor amounts of the copper sulfides, bornite and chalcopyrite. The ore is associated with quartz lenses and as disseminated grains in altered portions of an ancient lava flow.

The district, as a whole, appears to hold little promise of becoming a major mining district.

Miscellaneous Deposits

There are few areas, west of the Coastal Plain Province, which have not been prospected for sulfide deposits. Many areas have supported isolated, individual mines, some of which were temporarily important.

Toncrae-Howard mine, Floyd County.-- The Toncrae-Howard mine is located near the southeastern border of Floyd County, about 8 miles south of the town of Floyd. Except for extended periods of intermittent operation, the history of this mine is similar to that of the Great Gossan Lead. At this mine gossan iron ore was mined from 1800 to 1850, following which secondary copper ores were produced over a five-year period. Some mining of the primary pyrrhotite ore took place in the period from 1905 through 1908.

The ore zone is a replacement body of massive sulfides, comprised mainly of pyrrhotite, pyrite, chalcopyrite, and sphalerite. Attractive copper values in the primary ore have made this mine, and its extensions, the site of current exploration activities.

Sutherland prospect, Floyd County.-- This prospect lies on the Floyd-Patrick County boundary, one mile south of the Toncrae-Howard mine. The immediate area was prospected about 1850 and the one adit present probably dates from that time. Sulfide mineralization consists of pyrrhotite with minor copper values. The locality was explored in 1943 by the U. S. Bureau of Mines, with disappointing results.

Amherst-Appomattox counties.-- The Glades area, Amherst County, and the Beckham area, Appomattox County, produced copper ore in the pre-Revolutionary War period and again during the copper boom of 1880. The copper minerals were reportedly bornite and chalcopyrite, though little is known of the basic geology and potential commercial possibilities of these areas. Small abandoned mines and prospects are numerous.

Albemarle mine, Albemarle County.-- The Albemarle lead-zinc mine is located three miles northeast of Faber in southwestern Albemarle County. It was worked during the Civil War and again in 1905 and 1906. The thin vein was worked over a lateral distance of some 1000 feet; the major ore minerals were sphalerite and galena, with minor chalcopyrite.

Stony Point mine, Albemarle County.-- Copper has been reported from the abandoned Stony Point iron ore mine, about 12 miles northeast of Charlottesville. The deposit was worked for gossan iron ore to depths of more than 100 feet, where minor amounts of chalcopyrite were encountered. The heavy gossan has been attributed to alteration of the chalcopyrite; however, diamond drill cores from the property show disappointingly small amounts of this mineral. The gossan may be due to alteration of the iron carbonate, siderite.

The foregoing brief descriptions are not intended to be comprehensive. Many other intriguing, and possibly equally important, prospects are known throughout the State. Locations and descriptions of these mines and prospects may be found in the selected list of publications at the end of this report.

Future of Sulfide Mining

Large-scale increases in the production of copper, lead, or zinc in Virginia can only be accomplished through the discovery of new orebodies. Increased output of pyrrhotite-pyrite ores, for use in the chemical industry, could be initiated at any time, largely from known reserves in the Great Gossan Lead district.

The great needs today in the basemetal industries of the United States are for copper, nickel, and cobalt. Recent sharp price increases for the refined metals, especially copper, reflect the shortages in these materials. Increased market values permit exploitation of mineral deposits previously considered sub-ore or marginal and offer greater prizes in new orebodies. Exploration activities have increased markedly in the southeastern Piedmont states, in the past five years. At least a dozen exploration or mining companies are known to be operating in Virginia at present. Such concentration of activity alone constitutes a note of optimism in the search for basemetal sulfides.

Prospecting techniques of today are far removed from those employed in the last century. Whereas it is true that no substitute is known for trenching, pitting, drilling, and exploratory shaft-sinking, a great deal of data can be gathered prior to these expensive operations through advanced geochemical, geobiochemical, and geophysical techniques. Chemical analyses of soil and plants in a given area will often serve to delineate localities of abnormally high copper, lead, or zinc concentrations. Geophysical instruments, such as the gravimeter, magnetometer, self-potential, resistivity, and electromagnetometer provide much desirable data on the length, width, depth, and attitude of a mineralized zone, without the necessity of disturbing surface culture. All of these instruments have physical limitations, but are valuable tools in modern exploration. Certain of the geophysical instruments are adaptable to airborne operation, notably the magnetometer and electromagnetometer, and aerial geophysical surveys have proved successful in several areas. It has been recently reported that Roland F. Beers, Inc., is planning such a survey for parts of the northern Virginia Piedmont (Charlottesville Daily Progress, Nov. 5, 1955).

The relatively recent discovery of commercial orebodies at Ore Knob, N. C., and near Timberville, Va., are encouraging. Undiscovered orebodies undoubtedly exist in Virginia, but they will be costly and difficult to find. The efforts of exploration companies now operating in the State, and those to be later enticed, represent the best possibility of Virginia returning to the status of a major mining center.

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RECENT PUBLICATIONS ON VIRGINIA

Virginia Division of Geology Reprint Series 18 (January 1956), entitled "The Mineral Industry of Virginia (1952)" by Richard H. Mote and Alvin Kaufman, U. S. Bureau of Mines. Preprinted from U. S. Bureau of Mines Minerals Yearbook 1952, Vol. III. A review by commodities and counties of the mineral resources produced in Virginia -- mineral fuels, metals and nonmetals -- during the calendar year 1952.

The Office of Technical Information Service, U. S. Atomic Energy Commission, Oak Ridge, Tennessee, has just released as "Unclassified Report" -- RME-3107 -- a "Report of Radiometric Reconnaissance in Virginia, North Carolina, Eastern Tennessee, and Parts of South Carolina, Georgia, and Alabama," by M. H. Stow, Professor of Geology at Washington and Lee University. This report contains a more detailed discussion (accompanied by maps) of possible radioactive areas in Virginia than the article on "Uranium in Virginia" by Professor Stow, in the July 1955 issue of "Virginia Minerals." Copies of the report may be obtained, at a cost of 25 cents each, from the Office of Technical Services, Department of Commerce, Washington 25, D. C.

Virginia Engineering Experiment Station, Virginia Polytechnic Institute, published in December 1955, as Bulletin 106, a report on "Additions to Virginia Mineral Localities" by R. V. Dietrich, Associate Professor of the Department of Geological Sciences. The report, which is a supplement to Bulletin 88, "Virginia Mineral Localities," contains more than 150 entries, including 31 minerals and varieties, not reported in Bulletin 88.

TOPOGRAPHIC MAPS

Work was in progress during 1955 on eleven 15-minute quadrangles in the southern part of the Piedmont region. New engraved maps (on a scale of 1:62,500 and with a contour interval of 20 feet) have been issued of the Riceville and South Boston quadrangles covering parts of Halifax and Pittsylvania counties.

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MINERAL PRODUCTION OF VIRGINIA IN 1955

Preliminary estimates recently received by the Division of Geology indicate that the total value of the raw rock and mineral resources produced in Virginia during the 1955 calendar year will exceed $175,000,000, the greatest production value yet attained by the State's mineral industries. Further information on the production of mineral resources in Virginia in 1955 will be given in the next issue of "Virginia Minerals."

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MICROFILM AVAILABLE

In November, 1955, the Oil and Gas Branch of the U. S. Geological Survey microfilmed records and descriptions of some 30-odd oil and gas wells in southwestern Virginia, which it is proposed to publish as a bulletin at a later date. A copy of the microfilm has been made available to the Division of Geology. Arrangements have been made with the Alderman Library of the University of Virginia to use one of their "viewers" to show the material to visitors to the Division offices who wish to study the film here; also to have made, at a nominal charge, copies of the film for geologists and representatives of oil and gas companies who wish to obtain such.

* * *

RECENT ACTIVITIES

A reported yield of 30 to 35 gallons per minute was obtained from a water well completed in October, 1955, in "The Breaks Interstate Park" in Dickenson County, the site for which was located by the Ground-Water Geologist of the Division of Geology, following a preliminary examination of the "Park" area.

During the past three months, preliminary examinations were made of five properties in the Piedmont region and three properties in the Appalachian Valley region for radioactive materials. Field and laboratory tests of samples of rock from these properties failed to yield indications of radioactive materials of commercial importance; however, it is possible that continued search in the Piedmont and Southwest Virginia regions may reveal occurrences of uranium- or thorium-bearing materials of future economic value.

The Clinchfield Coal Corporation was reported to have begun, late in 1955, the opening of a new mine in Russell County which, when developed, will have cost about $4,000,000. It will have a production capacity of about a million tons a year and will employ between 350 and 400 miners.

Rockydale Stone Service Company of Roanoke recently began the development of a limestone quarry in Campbell County near the site of the Atomic Energy Reactor Plant now under construction. When completed and in full operation, the new quarry will have an annual production capacity of 200,000 tons of stone and will employ between 40 and 50 people. It will produce railroad ballast, road stone and concrete stone.

The Lonestar Cement Corporation near Haymakertown in Botetourt County, north of Roanoke, is now constructing another (4th) kiln and silo which, when completed, will increase production by 800,000 bbls. a year. This addition will bring the total annual capacity of the plant to approximately 3,250,000 bbls. of cement.

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PERSONAL NOTES

Arthur Bevan, former State Geologist of Virginia (1928-1947) and, from September 1947 until September 1955, when he retired, Principal Geologist of the Illinois Geological Survey, and Mrs. Bevan have returned to Virginia to live. They are now settled on their farm near Churchville in Augusta County. Dr. Bevan plans to continue field and research work on the geology of Virginia.

C. Coleman Fisher, Technical Editor and Mineral Economist, resigned from the Staff of the Division of Geology on September 2, 1955, to accept a position in research work with Metals Research Laboratories at Niagara Falls, N. Y.

William M. McGill has been elected to serve out the unexpired term of Watson Monroe, U. S. Geological Survey, as Senior Representative of the Capitol District of the American Association of Petroleum Geologists.

Division of Geology
Box 3667, University Station
Charlottesville, Virginia

MINERAL PRODUCTION OF VIRGINIA IN 1955

Preliminary estimates recently received by the Division of Geology indicate that the total value of the raw rock and mineral resources produced in Virginia during the 1955 calendar year will exceed $175,000,000, the greatest production value yet attained by the State's mineral industries. Further information on the production of mineral resources in Virginia in 1955 will be given in the next issue of "Virginia Minerals."

* * *

MICROFILM AVAILABLE

In November, 1955, the Oil and Gas Branch of the U. S. Geological Survey microfilmed records and descriptions of some 30-odd oil and gas wells in southwestern Virginia, which it is proposed to publish as a bulletin at a later date. A copy of the microfilm has been made available to the Division of Geology. Arrangements have been made with the Alderman Library of the University of Virginia to use one of their "viewers" to show the material to visitors to the Division offices who wish to study the film here; also to have made, at a nominal charge, copies of the film for geologists and representatives of oil and gas companies who wish to obtain such.

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